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UNEMPLOYMENT, MIGRATION AND INDUSTRIALIZATION IN YUGOSLAVIA, 1958-1982

by

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The experience of high and growing levels of urban unemployment has been a characteristic feature of economic performance in a large number of developing economies which have begun industrialization in the post-war period. Detailed descriptions of this phenomenon can be found in a number of studies, notably Turnham (1971) and Squire (1979). It has also been a feature of post-war industrialization in Yugoslavia. Unemployment in the socialized sector (mainly urban, mainly non-agricultural) increased from 4.9% in 1957 to 7.6% in 1967 and then to 12.1% in 1977. The most recent OECD report (1983) records some 826,000 job-seekers [1] in 1982. This phenomenon took place in conjunction with mass worker emigration abroad which developed following the reforms of the mid-sixties as more liberal, outward-looking policies were introduced. By 1973 more than one million Yugoslav workers were employed abroad, mainly in the Federal Republic of Germany. Following years saw a fall off in these numbers as the onset of recession in Western Europe closed off job opportunities for migrant workers, and led to the introduction of more restrictive immigration laws. Needless to say, the observation of high levels of unemployment and of emigration appears somewhat disturbing in a labour-managed economy where "workers' sovereignty" is valued at least equally with "consumers' sovereignty" as an objective of social and economic policy. [2]

In section 1 the conventional explanation of the Yugoslav unemployment experience is discussed and criticized. In section 2 the basis of an alternative approach is set out, and a formal model is developed in section 3. In section 4 the empirical results are presented, and conclusions are drawn in section 5.

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1. The Conventional Explanation

The dominant approach to the analysis of the Yugoslav non-agricultural sector, at least for the post-1965 reform period, has been the application of the neoclassical theory of the "labour-managed firm" [3]. There are several respects in which the Yugoslav "self-managed firm" differs from this prototype, especially in regard to the simplifying assumption of the thoery that the labour-managed firm seeks to maximize disposable income per head of the workforce. In his magnum opus Vanek (1970) was careful to emphasize the distance between the pure theory and Yugoslav practice. Nevertheless, a number of studies have revealed a congruence between the predictions of theory and the empirical evidence available from post-reform Yugoslavia (Estrin, 1979, 1981n 1982) [4].

The short-run version of the theory was initially set out by Ward (1958), and Vanek (1970). In static equilibrium the firm's demand for labour is such as to maximize income per worker. When material costs, capital stock and hours per worker are fixed exogenously, and price is given to the firm on a competitive market, then equilibrium occurs where marginal value product per worker equals the value of average product per worker net of per-worker capital costs. This equilibrium balances the contradictory pressures of expansion, (required to spread the fixed capital costs over the largest number of workers) and contraction (since the distribution of revenues over the smallest number would be to the advantage of those employed). Thus equilibrium labour demand, given product price, is essentially determined by technology specific to each firm, and is not determined

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by market processes. (In contrast, equilibrium labour demand of firms in a capitalist economy, given product price, is determined by both technology and labour market conditions which determine the ruling wage.) When product price varies, so does labour demand. But again there is an important distinction from the capitalist case, since equilibrium labour demand varies inversely with price. In this setting, fiscal and monetary policies designed to stimulate the economy and raise the demand for labour will be unsuccessful. The model illuminates "a perverse universe" in which "a rise in effective demand reduces employment, which increases investment to set up new firms, which increases effective demand which increases unemployment . . . a vicious circle of positive feedback" (Meade, 1973, p. 409).

The long-run case has been investigated in Furubotn (1971, 1976) and in Pejovich (1973, 1976). Here the goal of the firm is to maximize the discounted stream of expected future income. However the particular institutional constraints of self-management in Yugoslav practice--in particular the property-rights structure --will prevent the worker-managed economy from attaining a full-employment equilibrium over time. The problem arises, since workers can save for their future consumption by two methods, (a) a privatised method through individual savings deposits, or (b) a cooperative method, by reinvesting some proportion of the firm's net income within the firm itself. The theory suggests that workers will be more inclined to the former method since collective assets of the firm are "non-owned" and the investment, being embodied in enterprise assets, is not recoverable by any individual who has notionally contributed to its purchase. Consequently a

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much higher rate of return is required to induce investment within the firm relative to that required to attract individual investment in savings deposits. Where bank credit is available the situation may be remedied to some extent, and internal investment within the firm may be increased. But this will not happen to the same extent as the increase in bank credit so long as this is fungible, since bank credit may then act as a substitute for the self-financing of a firm's capital programme and may merely result in a larger allocation of income to consumption. As a result, investment, and hence employment, will be less than it need be, and unemployment may result. [5] Pejovich concludes that "the high unemployment rate is at least in part, generated by the post-reform system in Yugoslavia" (i.e. by the system of self-management) (Pejovich, 1973, p. 301).

Now it was certainly the case, as Sapir (1980) and Estrin (1982) point out, that the trend rate of growth of output and employment was lower in the decade following the 1965 reform than it had been in the previous decade. Since it is usually argued that these reforms introduced a genuinely self-managed market economy for the first time, this evidence is taken as indirect support for the theories outlined above. However, looked at from a broader perspective, one could argue that the post-1965 experience has been pilloried unduly. In addition to an extension of economic decentralization to enterprises, one of the key objectives of the 1965 reforms had been an increase in labour productivity and in international competitiveness, as previous import-substitution strategies of industrialization came to the limits of their effectiveness (Flaherty, 1982). In order to induce the necessary

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shake-out of labour a sharp credit squeeze was operated between 1965 and 1967 (Bajt, 1967). Tyson (1979) points to a noticeable decrease in the ratio of firms' cash balances to their transactions following the reforms. As a result there was a complete cessation in the number of new job openings between these years. Compared to the eight years before the reforms, when employment growth in the socialized sector had proceeded at an average rate of 4.5%, in the eight years following the reforms (1965-72) the average growth rate fell to 2% p.a. However if the exceptional years 1965-67 are excluded, the growth rate of employment in the subsequent eight years (1968-1975) was 3.5% p.a. On this view, although there was some fall-off in the rate of employment growth following the reforms, the change was not as dramatic as some have suggested.

As regards output attention has focused upon the output of the industrial sector, which fell from a growth rate of 10.3% between 1958 and 1965 to one of 7.6% between 1966 and 1974. [6] This compares with a fall-off in employment growth in the sector from 5% p.a. to 3.3% p.a. over these years. These data should be interpreted cautiously, however. Moore has shown that if due attention is paid to the resource use involved in the structural changes initiated by the reforms and arguably required at the particular stage of development achieved by the Yugoslav economy at that time, then the overall decline in the growth rate of output and employment looks not only less precipitous, but also devoid of 'kinks' around the reform years. In addition, when the performance of the 1970's is compared with that of the 1960's, the decline in growth is less severe. Between 1960-1969

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manufacturing output grew at a rate of 7.7%, [7] whereas between 1970-1979 it grew at a rate of 6.9%. [8] This seems to support Moore's view that the growth retardation of the mid-sixties disguised a period of "latent growth" during which structural changes were occurring. Finally, whilst Sapir suggests that, on the basis of international comparisons, Yugoslav rates of manufacturing growth were falling gradually below average following the reforms, evidence from the World Bank (1981) suggests the contrary. For the period 1960-70 the Yugoslav rate of growth of manufacturing output was exceeded in 19 out of a sample of 33 "middle income" developing countries, and 8 out of 12 "industrial market economies", for the period 1970-79, the rate was exceeded in only 9 of the former and none of the latter. [9]

Moreover, the decentralized self-managed firms have been noticeably lacking in any tendency towards underinvestment, with the rate of gross capital formation remaining high by international standards (Maddison, 1971). Tyson (1977) observes that during the 1965-71 period, "retained earnings accounted for about 30 percent of total domestic sources for fixed investment" (p. 396) and she goes on to show, using a simple permanent income model of enterprise savings behaviour that the long-run target rate of saving out of enterprise net income was around 25 percent. Accumulation increased at such a rapid rate after the reforms, in fact, that the aggregate capital-labour ratio in the industrial sector increased dramatically.

These empirical observations clearly run counter to the long-run arguments put forward by Furubotn and Pejovich. As Tyson (1977) argues there are good reasons to suppose that self-

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managed firms will want to invest, despite Furubotn-Pejovich effects, in order to maintain their market position: "If a single self-managed firm persistently underinvests in an economy of other self-managed firms, it will find itself saddled with excessively high costs, dwindling markets and dissatisfied workers" (p. 397). Perhaps the economic behaviour of large self-managed enterprises is not so very different from that of large capitalist corporations in this regard.[10] The implications for the static Ward-Vanek theory are not so clear. Estrin (1982) argues that the evidence on growth retardation and increasing capital-intensity is consistent with predictions from the theory of the labour-managed firm, and this view is echoed by Sapir (1980). However we have seen that the growth retardation was not as severe as they suggest, and it is not clear that the static theory is well tested by evidence concerning long-run trends in growth rates when the capital stock is changing. As argued in Estrin and Bartlett (1982) the issue of the relevance of the static theory to the post-reform environment in Yugoslavia awaits some more research upon direct tests of the central hypotheses, such as those concerning supply response. A preliminary investigation by Stewart (1981) fails to detect any inverse association between labour demanded by an industrial sector, and relative prices. On the other hand, the evidence on increasing income dispersion after 1965 presented by Estrin (1979, 1981) does lend support to the idea that the 1965 reforms did increase the level of disintegration on the labour market, enabling firms to set income levels with little regard to any market determined level of incomes.

There seems to be little evidence therefore to support the view that the emergence of widespread open unemployment in the

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social sector can easily be explained by appeals to the supposed disinclination of labour-managed firms to restrict employment, or to any fundamental slowdown in the rate of job-creation in the post-reform years. Moreover, there is little clear association between any slowdown in employment growth and the rise in unemployment. For example, from 1965 to 1968 the number of social sector jobs fell by 21 thousand p.a., and unemployment rose by 15 thousand per annum; and yet from 1972 to 1977, while social sector employment rose by 156 thousand p.a., unemployment was also rising dramatically by some 64 thousand per annum.

2. "Dual" development in Yugoslavia

So far we have concentrated our attention on one major feature of post-war Yugoslav industrialization--self-management. However, as we shall attempt to show below, the growth of unemployment cannot properly be understood unless we also consider a further feature of fundamental importance to post-war industrialization, namely the dualistic character of Yugoslavia's economic growth. Dualism has found a very clear expression through a number of closely related dichotomies: agricultural/industrial, rural/urban, private/socialized ownership, small/large scale, low/high income. All these cleavages mirror and reinforce each other. Economic growth has been accompanied by a very rapid structural change which has increased the importance of the industrial sector relative to the agricultural. As late as 1970-1975 the ratio of agricultural to industrial labour force was diminishing at a rate of 9% p.a. This process is displayed in diagram (1). Of course growth with structural change is a common feature of

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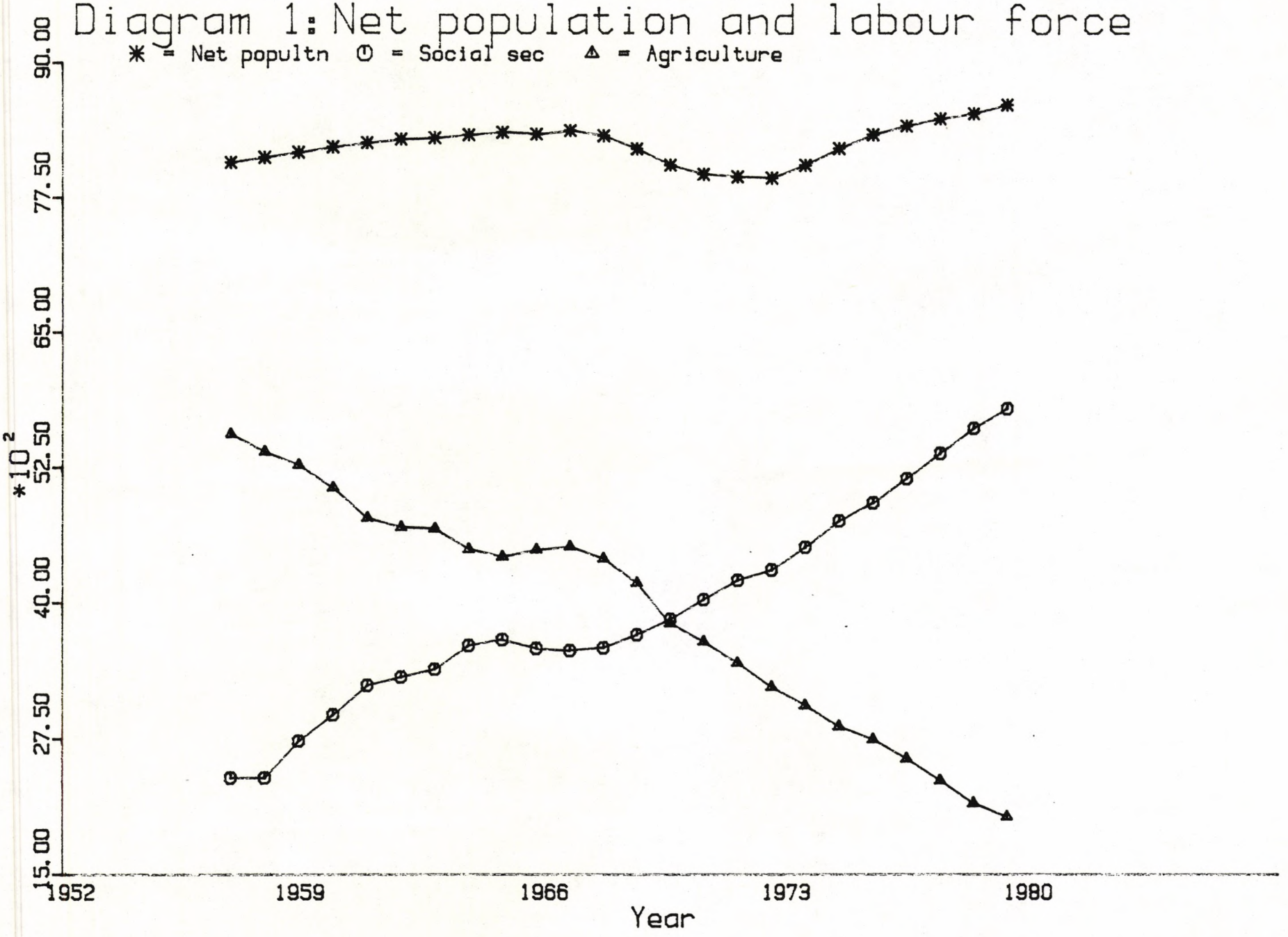
Diagram 1: Net population and labour force



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growth in developing economies, and a number of empirical regularities in the process have been investigated by Chenery and Syrquin (1975). According to their analysis the industrial share of production was well above the "average" given the level of development by 1965. This suggests that theories of dualistic growth may well hold some relevance for an analysis of post-war development in Yugoslavia. Whilst early models of dualistic development (Ranis and Fei, 1964, Kelly et al., 1972) considered that the market mechanism could be relied upon to guide the dualistic economy along a transitional growth path characterised by full employment of labour resources, later research indicated that dualism tended to be associated with marked differentials in sectoral income levels (Lipton, 1977, part III). Under these circumstances dualistic growth can be expected to generate substantial urban unemployment (Todaro, 1969, 1976, Bartlett, 1983). In this context it becomes clear that an adequate explanation of the unemployment phenomenon in Yugoslavia needs to concern itself with the supply side of the labour market, in addition to the demand side considerations highlighted in our discussion of the self-managed enterprise.[11)]

That rural-urban migration has been an important feature of post-war development in Yugoslavia is indicated from a number of sources. Tanic (1979) reported that between 1946 and 1961 some 1.3 million people left rural areas and migrated to the cities. The figure for 1961-1971 is given as 1.4 million. (Hawrylyshyn gives a similar estimate.) Other authors give a qualitative account of the social importance of rural-urban migratory flows on the basis of field studies and personal interviews (e.g. Halpern and Halpern (1972) and Simic (1973)). In addition, in the post-reform period

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the growth of external migration, mainly to other European countries has been an additional feature determining labour supply to the social sector of the economy. From a figure of about 200 thousand in 1965, the number of Yugoslav workers living abroad rose to 1.1 million by 1973, falling off somewhat thereafter as the West European economies began to place restrictions on in-migration in response to the developing economic crisis in their own economies.

Clearly, to the extent that net migration and natural labour force growth exceeds new job openings in the social sector, unemployment will increase. As Shrenk et al. (1979) observe, "migration out of the agricultural sector has been accompanied at least in part by an increase in the ranks of the registered unemployed" (p. 246). But if unemployment is increasing the question arises as to why workers from the rural sector would continue to migrate to the urban sector in search of work. Singleton suggests that "the emphasis on large-scale heavy industry and the neglect of agriculture and light industry is a factor in stimulating a flow of workers out of rural areas into republican metropolises in excess of the opportunities available for a satisfactory urban life" (Singleton, 1979). More generally Shrenk et al. and Dubey (1975) have suggested that demand-pull considerations have been an important stimulus to rural-urban migration.

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3. Expected income, migration and unemployment

The basic hypothesis of the model is that intersectoral migration takes place in response to the expected income differential between the two sectors.[12] Expected urban incomes are the product of actual average urban incomes (i) and the probability (p) that a migrant will find an urban job. This probability is given by the ratio of new job openings ($E_t - E_{t-1}$, where E is the level of employment) to the number of job seekers (U, the level of unemployment). Expected rural incomes are equal to actual rural incomes (a) since the institution of peasant family farming ensures that all rural workers are absorbed in employment on the farm. Urban incomes are given exogenously, since, as was argued above, under self-management income per worker is uniquely determined by the capital stock and the technology, given the structure of relative prices, and not by conditions on the labour market.[13] Similarly we shall assume that rural incomes can be treated as an exogenous variable, set either by subsistence requirements or by custom (so that state-regulated agricultural prices are set at a level sufficient to provide a customary real income to farmers). Other exogenously determined variables include the rate of growth of employment in the socialized (urban) sector (g),[14] the natural rate of growth of the labour force (n), and the rate of external migration (x).[15]

The fundamental equation of the model relates the rate of migration (m) from the agricultural sector to the expected income differential between the two sectors so that

$$m = m(p,i,a) \qquad (i)$$

with $m_1 > 0$, $m_2 > 0$, $m_3 < 0$. The probability variable is defined as

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$$p = \frac{F_t - E_{t-1}}{U_{t-1}}$$

or, in continuous time:

$$p = \frac{gE}{U} = \frac{g(1 - u)}{u} \qquad \text{(ii)}$$

The change in the unemployment rate (u) can be shown to be given by:

$$\dot{u} = (1 - u) \{(m - \lambda x) \theta - (g + \lambda x - n)\} \qquad \text{(iii)}$$

where λ is the proportion of emigrants originating from the social sector, and θ is the ratio of the agricultural to the non-agricultural labour force (the derivation is given in the Appendix).

Similarly, the rate of change of the sectoral composition of the labour force is given by

$$\dot{\theta} = -(1 + \theta) \{(m - \lambda x) \theta + x (1 - \lambda)\} \qquad \text{(iv)}$$

The model thus contains 4 equations in 4 endogenous variables and 6 exogenous variables.[16)]

Substituting (i) and (ii) into (iii) and (iv) gives a system of autonomous differential equations in u and θ describing the structural transformation of the economy as industrialization takes place:

$$\begin{cases} \dot{u} = F(u, \theta; g, n, x, i, a, \lambda) \\ \dot{\theta} = G(u, \theta; g, x, i, a, \lambda) \end{cases} \qquad \text{(v)}$$

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The motion can be displayed in a phase diagram, and is shown in diagram 2. Its qualitative features can easily be described. Put $Z = (m - \lambda x)\ \theta$; $Y = (g + \lambda x - n)$; $V = x\ (1 - \lambda)$ then the system becomes:

$$\dot{u} = (1 - u)(Z - Y) \qquad \text{(iii)'}$$

$$\dot{\theta} = -(1 + \theta)(Z + V) \qquad \text{(iv)'}$$

Clearly, when $Z > Y$, the rate of unemployment is rising. When $Z < Y$, the rate of unemployment is falling. When $Z > -V$ the ratio of rural to urban labour, θ, is falling. Thus so long as $m > \lambda x$ holds, θ will be falling. (In fact m will never fall below λx, since, should it do so, $(Z - Y)$ becomes negative, the rate of unemployment falls and, by (i) and (ii) m will rise again).

Now consider as initial conditions the case where θ is large and u is low such that $Z > Y$. Then u will be rising and so by (i) m will be falling. At the same time θ will be falling. As both m and θ fall, eventually Z will fall below Y, so that u will begin to fall. Now m will begin to rise, and although θ will continue to fall, there is a question as to whether u will fall off continuously. In fact it will do so since any faltering in u's decline will choke off the rise in m.

Thus the path of the unemployment rate over the structural transition associated with dualistic growth describes an inverted U-shape, at first rising and then falling off again. The higher is λ and x the sooner will the turnaround occur, whilst the higher is n the more delayed it will be.

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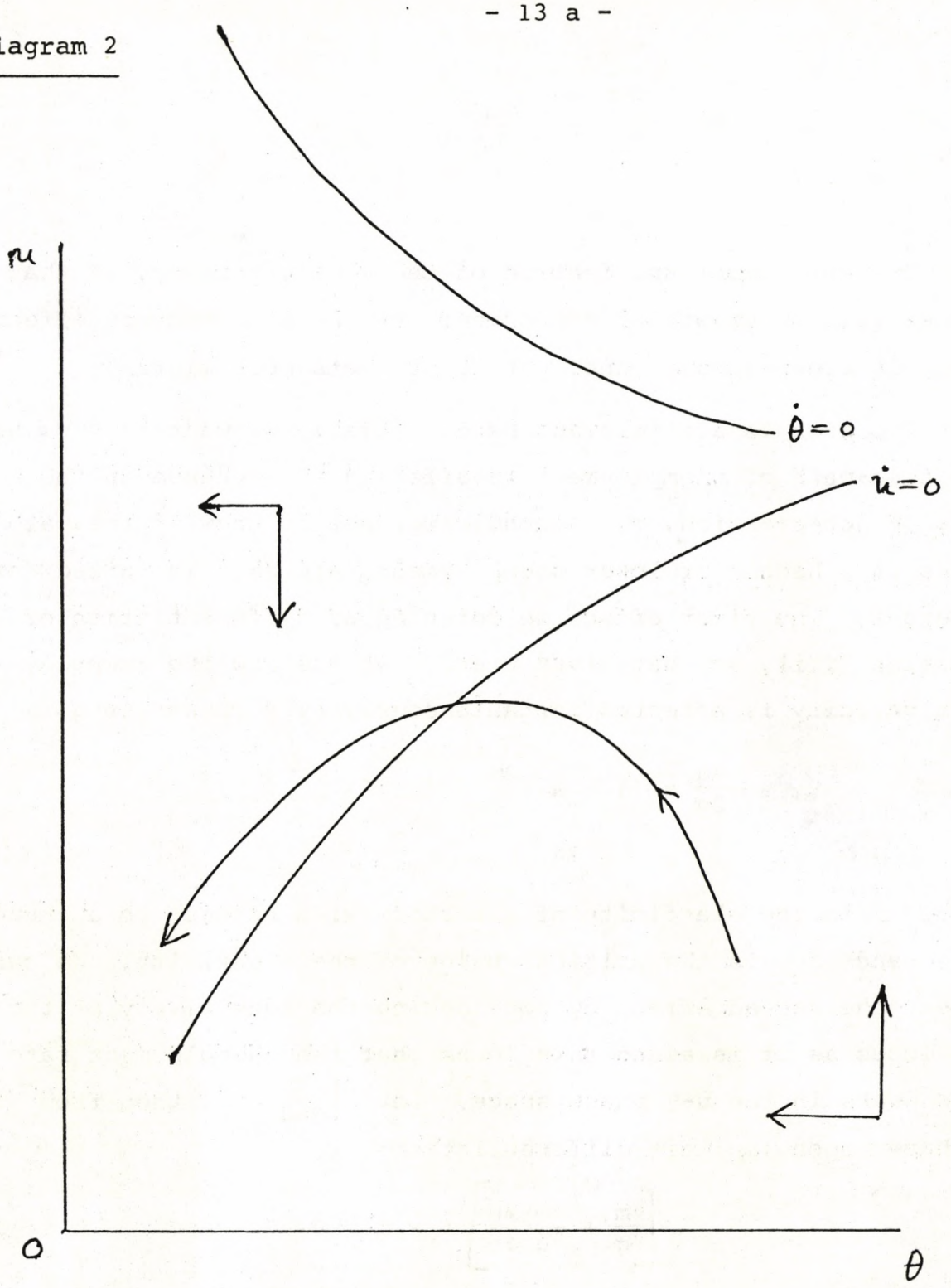
Diagram 2



Path of the unemployment rate over the structural transition

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The most important feature of the model, however, is that a higher rate of growth of employment, g, has an ambiguous effect since it creates more jobs, yet it attracts more migrants.

Two effects are relevant here. Firstly we want to know how the time-path of unemployment is affected by a change in the rate of job-creation, g. Secondly we want to know if the path peaks at a higher or lower unemployment rate as g is raised (or lowered). The first effect is detected by differentiation of equation (iii), so that given u and θ we see how the unemployment velocity is affected instantaneously by a change in g:

$$\frac{\partial \dot{u}}{\partial g} = (1 - u)\left(\frac{\partial m}{\partial g} \cdot \quad - 1\right) \gtrless 0$$

$$\text{as} \quad \zeta \gtrless \frac{g}{m \cdot \theta} = \zeta_{ci} \qquad \text{(vi)}$$

where ζ is the elasticity of migration with respect to a change in g, and ζ_{ci} is the critical value of the elasticity. We can detect the second effect by considering the sensitivity of the $\dot{u}=0$ locus as it is along this locus that the unemployment rate path peaks in the u-θ phase space. Let $u\big|_{\dot{u}=0} = \tilde{u}$, then from (iii) we have, upon implicit differentiation:

$$\left[\frac{\partial m}{\partial g} + \frac{\partial m}{\partial \tilde{u}} \frac{\partial \tilde{u}}{\partial g}\right] \theta - 1 = 0$$

so that

$$\frac{\partial \tilde{u}}{\partial g} = \frac{1 - (\partial m/\partial g) \cdot \theta}{\partial m/\partial \tilde{u} \cdot \theta} \gtrless 0$$

$$\text{as} \quad \frac{\partial m}{\partial g} \cdot \frac{g}{m} = \zeta \lessgtr \frac{g}{m\theta}$$

but since $\dot{u} = 0$, using (iii) we have:

$$\zeta \gtrless \frac{g}{(g - n) + \lambda x (1 + \theta)} = \zeta_{cii} \qquad \text{(vii)}$$

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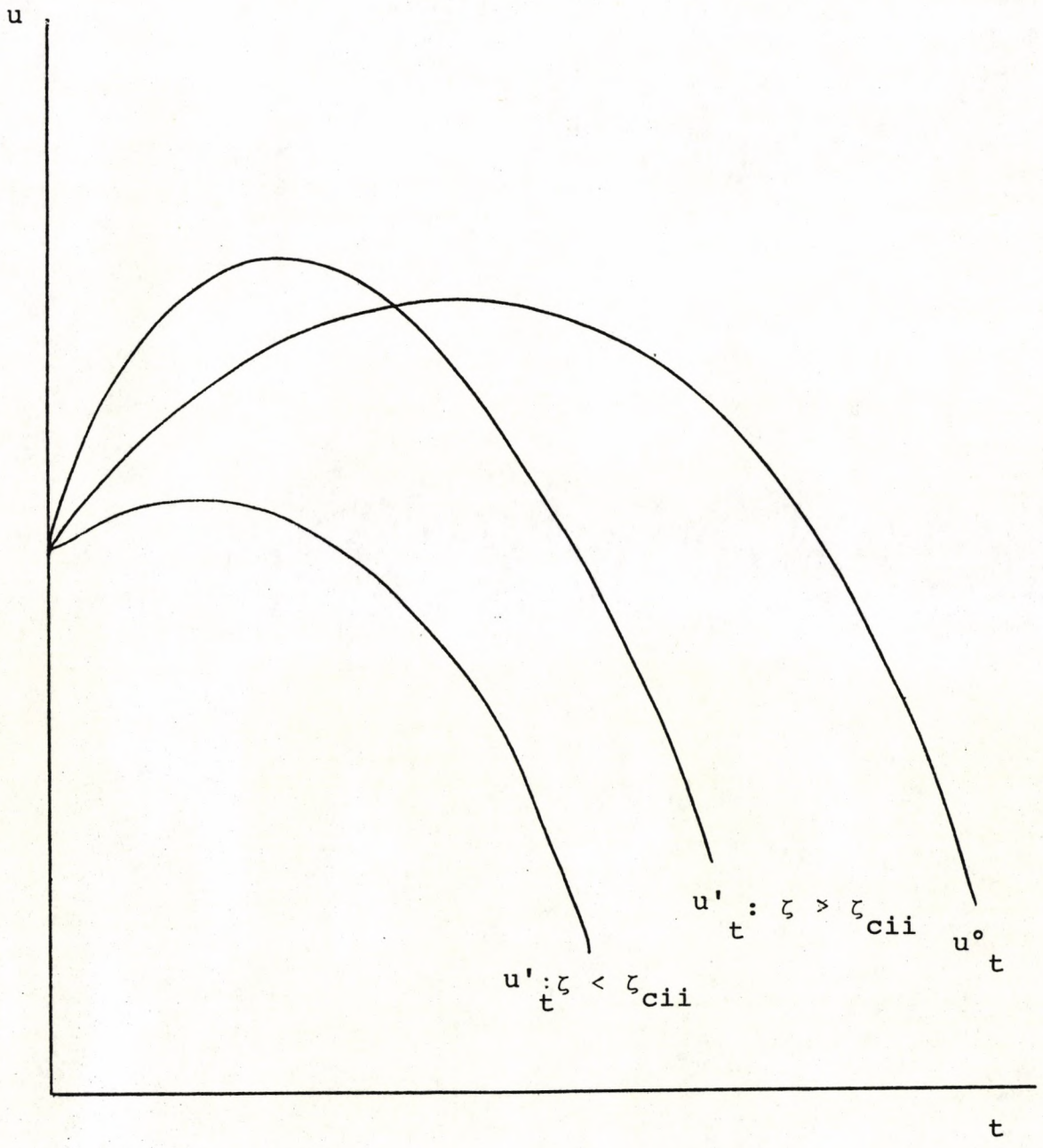
Diagram 3

Paths of the unemployment rate following an increase in the rate of employment growth, g.



u°_t : initial path of the unemployment rate

u'_t : path after an increase in g.

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The implications of these results for the path of the unemployment rate over time are shown in diagram 3. In the diagram the effects of an increase in the rate of job creation are indicated, and of course in all cases the effect is to shorten the time taken in achieving the structural transition, as an increase in g speeds up industrialization. Thus the peak unemployment rate will always occur sooner when g is higher. However whether the peak unemployment rate is raised or lowered under the higher growth policy depends upon condition (vii) and is thus an empirical question; similarly whether the time path is raised or lowered depends upon the way in which condition (vi) is fulfilled.

4. Empirical Results

We begin by estimating the migration function. Negative values of some variables preclude estimation in log form and so the equation has been estimated for the entire period in linear form with the following result:

$$m = \underset{(2.0)}{-0.01} + \underset{(8.2)}{0.047}p + \underset{(3.7)}{0.34\times10^{-5}}i - \underset{(2.0)}{0.39\times10^{-5}}a$$

$$N = 20;\ R^2 = 0.89;\ DW = 1.85 \quad \text{(viii)}$$

Here bracketed figures refer to the t-statistic, N is the number of observations and DW is the Durbin-Watson statistic for first order autocorrelation. The coefficients on the employment probability and the social sector income variables are significant at the 5% level and have the expected signs, that on agricultural incomes is significant at the 10% level only, but again has the expected sign. The R^2 is high indicating that the equation explains 89% of the variation in the dependent variable and serial correla-

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tion of the residuals appears to pose no problem in this time-series estimate judging by the Durbin-Watson statistic, which lies just above the critical value d_u of 1.83. Thus surprisingly good confirmation of the underlying migration hypothesis is supplied by the data, and we cannot reject the hypothesis that the migration probability mechanism is operating in such a way as to ensure that any increase in employment growth will induce an inflow of migrants into the social sector which will to a certain extent offset the initial favourable impact of the employment growth upon the numbers of the unemployed.

In diagram 4 time series plots of the migration rate, the expected income differential and the job probability are displayed. It is clear that much of the work is being done by the job probability variable, and indeed this variable recorded the smallest standard error on the parameter estimates.

We are now in a position to consider the policy implications of these results. Given a mean value of 0.04 for the migration rate and a mean value of 0.48 for the job probability, we can estimate the migration rate elasticity as

$$\zeta = \frac{\partial \mathbf{m}}{\partial p} \cdot \frac{p}{m} = 0.6$$

An equivalent value for the elasticity with respect to the rate of employment growth can be calculated from equation (ii).[17] However the critical value of the migration elasticity, ζ_{ci}, has an average value of 0.95. Since the average value of the migration elasticity lies below the critical value (ζ is significantly different from 0.95 at the 5% level) we conclude that an increase in the rate of growth of employment can be expected

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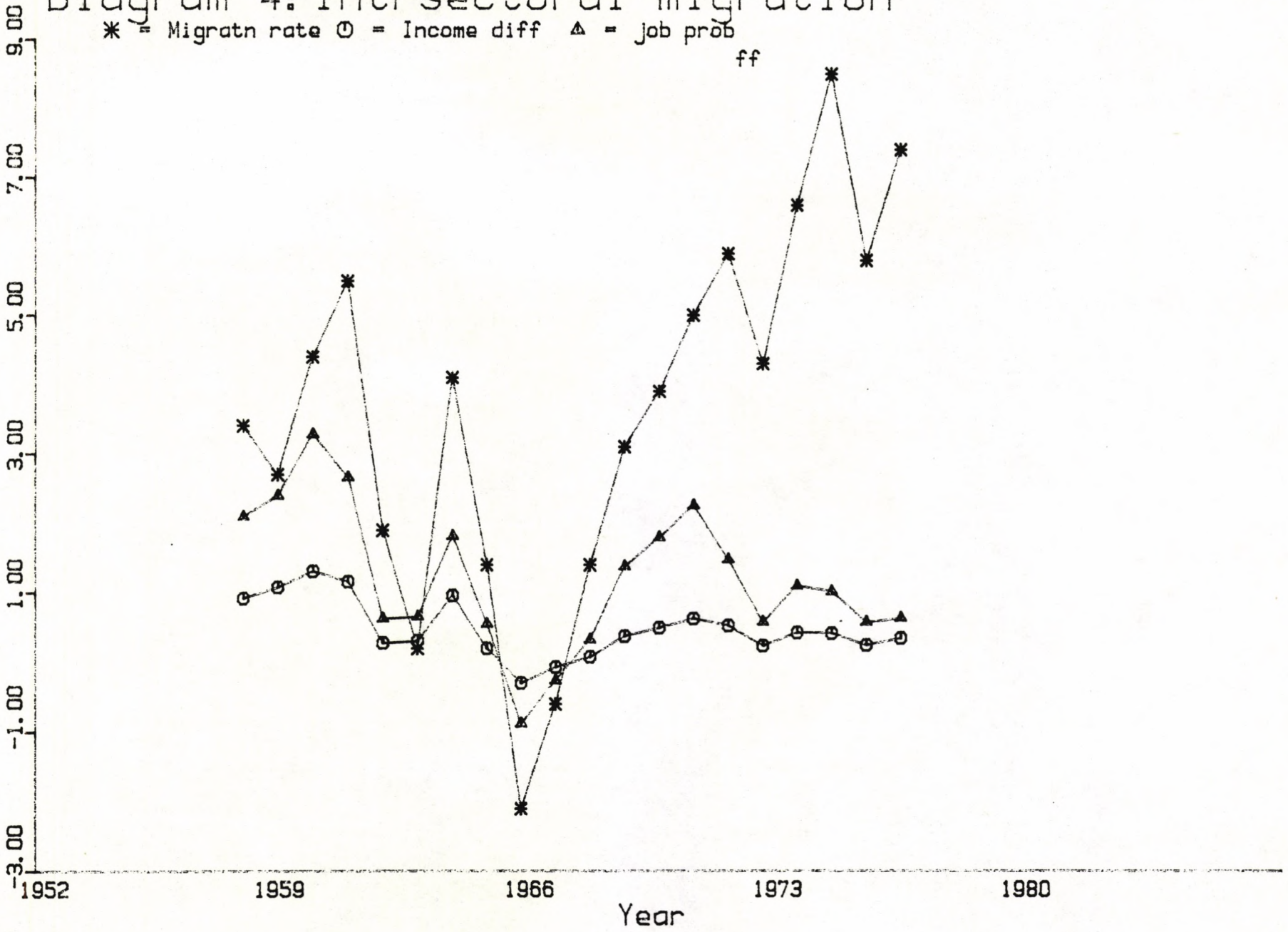
Diagram 4: Intrsectoral migration



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to lower the path of the unemployment rate over time. In confirmation ζ_{cii} has an average value of 1.03, so that we can also conclude that the peak unemployment rate would be reduced by a policy designed to increase the rate of growth of social sector employment. In other words perverse or paradoxical behaviour suggested as likely by Todaro (1976) can be ruled out. However we do not yet know directly the quantitative impact of employment growth upon unemployment. To see this we need to consider equations (iii) and (iv) above. It will beconvenient to take a linear approximation to these equations for purposes of regression analysis. Thus we have a linear model in difference equation form as follows:

$$u_t = a_0 + \underset{(-)}{a_1\theta_t} + \underset{(-)}{a_2 g_t} + \underset{(+)}{a_3 r_t} + \underset{(-)}{a_4 x_t} + a_5 u_{t-1} + e_{1t} \qquad \text{(ix)}$$

$$\theta_t = b_0 + \underset{(-)}{b_1 u_t} + \underset{(-)}{b_2 g_t} + \underset{(-)}{b_3 r_t} + \underset{(+)}{b_4 x_t} + b_5\theta_{t-1} + e_{2t} \qquad \text{(x)}$$

Here r = i/a, since we have seen from (viii) that the effects of i and a upon the migration rate are symmetrical, and so we can save on degrees of freedom by taking their ratio. The expected sign pattern of the coefficients is indicated below them in brackets. We also expect to observe $0 < a_5 < 1$, $0 < b_5 < 1$, meaning that we don't expect the model to show "explosive" behaviour. For these equations we expect $a_1 < 0$ and $b_1 < 0$ since we are using data for that part of the path across which the unemployment rate is rising. Since the system is simultaneous we initially employ a two-stage least squares method of estimation.

The result for the unemployment rate equation is reported as equation (1) in table 1. The equation performs well in the sense

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of having a high R^2 (0.95) and an h statistic which is below the critical value of 1.645 (5% level), indicating an absence of serial correlation in the residuals. The coefficients a_1, a_2 and a_5 are significant at the 5% level, a_3 at the 10% level and have the expected signs. However a_2 (the coefficient on g) is insignificantly different from zero. This is an important result in view of our discussion of the migration function, and can be interpreted to indicate that although the predicted impact of an increase in g upon the unemployment rate path is negative, the quantitative impact is so small, due to the additional migration that would be induced, as to be undetectable by the linear approximation estimate used here.

The equation explaining the structural change in the labour force is reported on equation (5) in the table. This equation also performs well with a high R^2 and low h statistic, but only the rate of employment growth and the lagged dependent variable are significantly different from zero. The lack of significance of the unemployment rate variable is surprising, and may be due to the use of the linear approximation method. However it may also indicate something more fundamental about the structure of the model, since u and g both enter here only through the migration function. If g is significant and u not, then this may imply that pull factors are of greater significance than the disincentive of prospective unemployment in influencing the migration decision. This interpretation is lent support by the following equation which repeats the migration function estimate, but enters the components of the probability variable separately:

$$\begin{array}{lllll} m = -0.09 + 0.67g + 0.004u + 0.31\times10^{-5}i - 0.4\times10^{-5}a \\ \quad\quad (0.44) \quad (8.8) \quad\quad (0.01) \quad\quad (3.8) \quad\quad\quad (2.23) \end{array}$$

$$N = 20;\ R^2 = 0.92;\ DW = 1.85 \qquad \text{(xi)}$$

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Whilst the coefficient on g has a very small standard error, that on u is insignificantly different from zero.

These results suggest a new specification for the model, in which the restriction $b_1 = 0$ is imposed upon the linear system vii and viii. The model now becomes recursive and can be estimated by ordinary least squares.[18] The new estimates are reported as equations (2) and (6). Little difference is made to the quantitative results reported above by this change of method. However a great deal of difference is made to the time path of the unemployment rate in the linear model. Now the unemployment rate just rises towards a maximum limit as the structural transition of the economy takes place. This can be seen from substitution of equation (viii) into equation (vii) (with $b_1 = 0$). We then get:

$$u_t = \gamma_0 + \gamma_1\theta_{t-1} + \gamma_2 g_t + \gamma_3 r_t + \gamma_4 x_t + \gamma_5 u_{t-1} + \varepsilon_3 \qquad \text{(xii)}$$

Here so long as $0 < \gamma_5 < 1$, as $\theta_{t-1} \to 0$, so $u_{t-1} \to u_t$.

The results for this estimation are reported as equation (4). Again, they differ little from equations (1) and (2). The importance of the rate of external migration is indicated, an increase of 1 percentage point in external migration giving rise to a reduction of 0.7 percentage points in the unemployment rate in a given year, and reducing the equilibrium unemployment rate by 2 percentage points. A decrease of one-tenth in the intersectoral income ratio, by contrast, reduces the unemployment rate in a given year by only 0.05 percentage points and reduces the equilibrium rate by only 0.15 percentage points. Once again the employment growth rate appears to have no impact of any statistical significance upon the unemployment rate. This implies that the employ-

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ment growth performance of the economy following the 1965 reforms has little actual bearing upon the issue of the unemployment rate. Any reduction of job opportunities, it seems, was offset almost entirely by a reduction in the number of migrants seeking social sector jobs.

Taking equation (4) as a whole, we can calculate the "equilibrium" unemployment rate by setting $\theta_{t-1} = 0$, $r_t = 2$, $x_t = 0$. The "equilibrium" unemployment rate by this method is 13.6%. Interestingly enough, the unemployment rate for the five years after the end of the estimation period was constant at 12% (from 1978 to 1982). Whether this reflects a temporary plateau before the downturn, as implied by the basic model, or whether it represents a more permanent feature of the Yugoslav labour market (as suggested by the "modified" model) we cannot yet tell. The constancy of the rate is certainly striking at a time when the EEC countries have been experiencing sharp increases in their rates of unemployment.

Equations (3) and (7), finally, are reported to illustrate the possible existence of multicollinearity between the x and r variables. When either is dropped as an explanatory variable, the coefficient and standard error on the other changes. This indication of some relationship between these variables is hardly surprising and points to the need for further research on the interrelationship between internal and external migration.

It is interesting to perform a 'backcast' with the model, simulating the effect of a zero external migration rate. In diagram 5 the unemployment rate path over time is displayed. Also shown are the predicted values from the regression equation,[19] and

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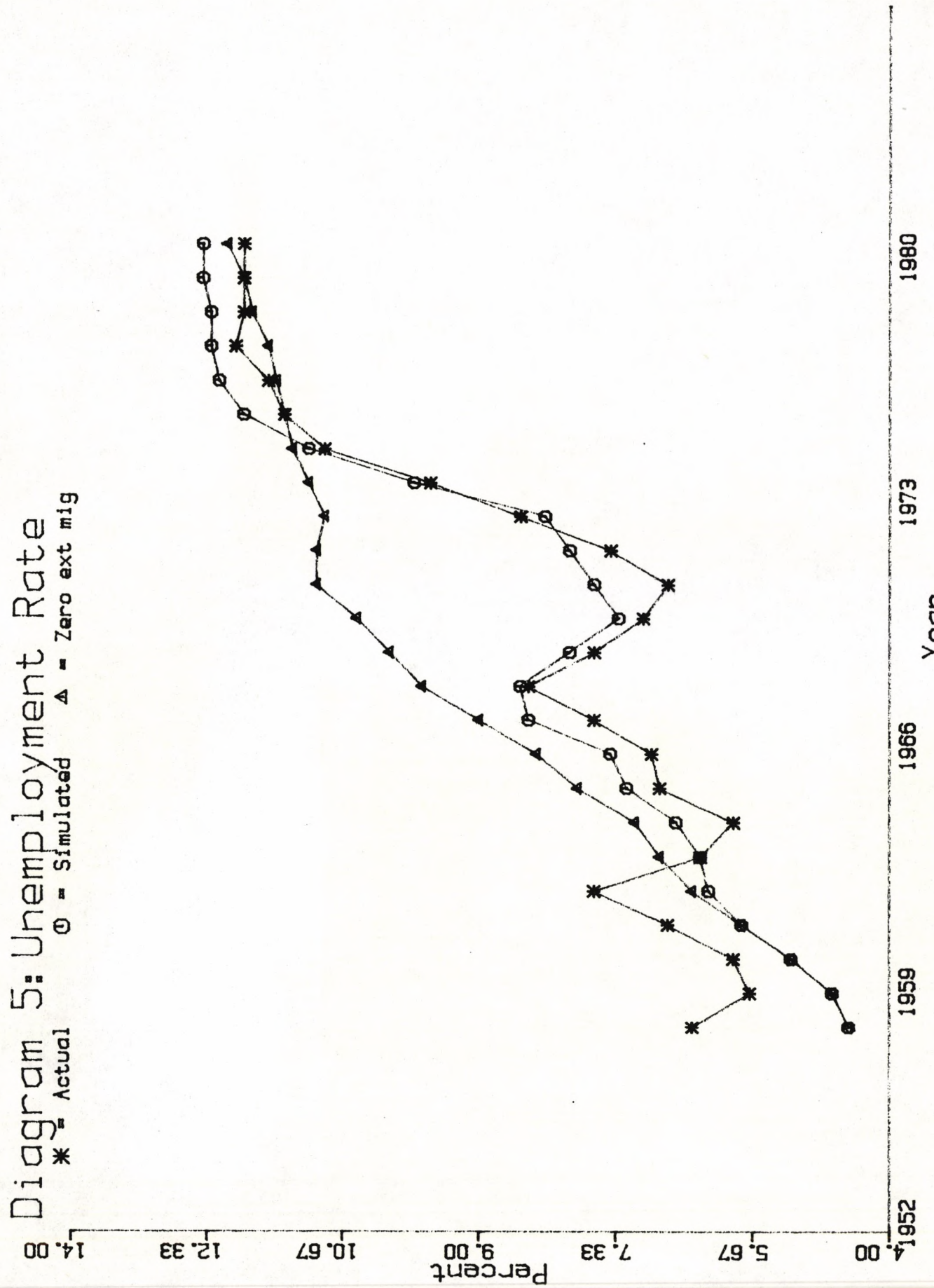

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the simulated values when x = 0. It can be seen that the effect of the simulation, of cutting off external migration is to "iron out" the dips in the unemployment rate path as it progressed towards its peak values in the late 1970's. But the increase in unemployment which results is much less than one would expect by just adding on the numbers of workers employed abroad to the domestic unemployment rate. By this procedure one obtains rates in excess of 20%. Clearly some substitution between domestic and migrant labour was taking place within the unemployment pool.

Conclusion

Far from being associated with an unwillingness to expand, the period of open self-management in Yugoslavia has been associated with dramatic industrial development and structural change. As Flaherty (1982) has pointed out this has also involved a change from import substituting to an export promoting strategy of industrialization. We have developed a theory which associates rapid economic development, even through various changes in strategic economic policy, with a continuously rising unemployment rate over a transitional period. At a later stage of development this search unemployment associated with demand-pull migration may begin to tail off. In Yugoslavia high rates of growth of urban labour demand, together with over-protection of the industrial sector, a system of industrial organization favourable to industrial labour, and "urban bias" (Lipton, 1977) in investment policy, led to a consistently maintained gap between urban and rural incomes. In this situation urban unem-

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ployment rose as industrialization proceeded, even though it was modified somewhat by opportunities for external migration. As we have seen, even faster rates of growth of employment may have been expected to have impinged favourably on the unemployment picture. But it would have been mistaken to have expected too much of such a job-creation policy. Although the migration elasticity was below its critical value, it was nevertheless sufficiently high to ensure that the largest proportion of newly created "extra" urban jobs would attract a nearly equal number of willing migrants from the rural sector wishing to take advantage of the new job opportunities.

Nor did the "open door" policy to the European labour markets reduce unemployment on a one-to-one basis. External migration did not proceed exclusively from the ranks of the urban unemployed. And even where it did there was a plentiful supply of new migrants ready to take the place of the departed. By the end of the period under study, the unemployment rate had reached a height it could have been expected to reach had open socialism been a mere figment in the eye of an anti-Stalinist dissident.

Nevertheless, it is clear that the unemployment experience was quite different from that which has subsequently caught up with the capitalist metropoles of Northern Europe. There an unemployment of crisis and contraction has been the order of the day, with far more serious social and political consequences for them than the search unemployment characterising the expansion phase of the developing post-war economy of Yugoslavia.

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Appendix

Notation

P = total active population, at home and abroad

X = stock of workers employed abroad

D = domestic labour force (= P - X)

E = social sector (urban) employment

U = social sector unemployment

A = agricultural labour force

L = E + U = social sector labour force

M = flow of intersectoral migration

θ = A/L = ratio of agricultural to social sector (industrial) labour force

ϕ = X/D = ratio of emigrant to domestic labour force

u = U/L = social sector unemployment rate

m = M/A = rate of internal intersectoral migration

$x = \dot{X}/D$ = rate of external migration

$n = \dot{P}/P$ = rate of natural growth of the labour force

λ = proportion of emigrants originating from the social sector

Since the total active population consists of employed workers in the social sector, the agricultural sector and abroad, and the unemployed, we may write:

$$P = E + A + U + X \qquad 1.$$

Differentiating with respect to time and dividing through by L gives:

$$\frac{\dot{P}}{P}\cdot\frac{P}{L} = \frac{\dot{E}}{E}\cdot\frac{E}{L} + \frac{\dot{A}}{A}\cdot\frac{A}{L} + \frac{\dot{U}}{U}\cdot\frac{U}{L} + \frac{\dot{X}}{D}\cdot\frac{D}{L} \qquad 2.$$

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Now, $\frac{P}{L} = (\frac{D + X}{D})\frac{D}{L} = (1 + \phi)(1 + \theta)$, and the change in the agricultural labour force is due to natural growth at a rate $n = \dot{A}_n/A$, migration and emigration so that

$$\dot{A} = (\dot{A}_n - M - (1 - \lambda)\dot{X})$$

Also, since $\frac{\dot{u}}{u} = \frac{\dot{U}}{U} - \frac{\dot{L}}{L} = \frac{\dot{U}}{U}(1 - u) - g(1 - u)$, we may write $\frac{\dot{U}}{U} = \frac{\dot{u}}{u(1 - u)} + g$. Using these relationships, (2) becomes:

$$n(1 + \phi)(1 + \theta) = g(1 - u) + n\theta - m\theta - (1 - \lambda)x(1 + \theta) + \frac{\dot{u}}{(1 - u)} + gu + x(1 + \theta) + n\phi(1 + \theta). \quad 3.$$

So that, after some manipulation:

$$\dot{u} = (1 - u)\{(m - \lambda x)\theta - (g + \lambda x - n)\}$$

which is equation (iii) in the text.

An expression for $\dot{\theta}$ can be derived in a similar fashion:

$$\frac{\dot{\theta}}{\theta} = \frac{\dot{A}}{A} - \frac{\dot{L}}{L} = \frac{\dot{A}}{A} - (\frac{\dot{P} - \dot{A} - \dot{X}}{A})\cdot\frac{A}{L} = \frac{\dot{A}}{A}(1 + \theta) - \frac{\dot{P}}{P}\cdot\frac{P}{L} + \frac{\dot{X}}{D}\cdot\frac{D}{L} \quad 4.$$

Thus $\frac{\dot{\theta}}{\theta} = (n - m - (1 - \lambda)x\frac{(1 + \theta)}{\theta})(1 + \theta) - n(1+\phi)(1+\theta) + x(1+\theta) + n\phi(1+\theta)$ 5.

and after some manipulation we have:

$$\dot{\theta} = -(1 + \theta)\{(m - \lambda x)\theta + x(1 - \lambda)\}$$

which is equation (iv) in the text.

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Notes

1. There is some debate over the correspondence between the figures for recorded "job-seekers" and the true amount of unemployment. Shrenk (1979) observes that "these figures must be interpreted cautiously: they include not only those that are openly unemployed but also private farmers seeking employment in the social sector and some students" p. 252. Moore (1980) however in his careful statistical study of Yugoslav industrialization considers that the registered figures "probably understate the actual levels of unemployment" p. 310. This may be due to non-registration on account of the limited coverage of means-tested unemployment benefits. Mesa-Lago (1971) suggests that the two effects more or less balance each other. In the job-search model developed below, the official category seems a reasonable proxy to the related true unemployment statistic.

2. Some positive economic benefits of external migration include the boost to the balance of payments due to worker remittances, whilst a serious adverse effect concerns the loss of skilled manpower resources to Yugoslav industry, see Baucic (1972).

3. A comprehensive account can be found in Ireland and Law (1983).

4. It should be noted however that there is a body of opinion which does not accept that the Yugoslav industrial sector can be usefully described as being composed of a set of labour-managed firms, of neoclassical ilk. Vanek (1972) describes

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the multiplicity of goals of the Yugoslav firm, whilst Moore (1980) regards self-management institutions as a cosmetic veneer covering an essentially centrally directed economic mechanism.

5. It should be noted that these results conflict with the general equilibrium analysis of Drèze (1976) who demonstrates the long-run equivalence between a labour-managed economy and a capitalist economy, under general competitive equilibrium.

6. Calculated from table 3 of Sapir (1980). Primary data from Statistički Godišnjak, index of output for the manufacturing sector, value added (drustveni proizvod). The output of the social sector as a whole fell less precipitously.

7. Calculated from Sapir, table 3.

8. Calculated from OECD (1981) table G.

9. Data taken from World Bank (1981) table 2 (Annex). Only those countries for which data was available for both periods have been included in the sample. "Middle income developing countries" are those which had per capita income over $370.

10. The largest 100 Yugoslav firms employ 43% of industrial workers, whereas the corresponding proportion in the USA is only 25% (Sacks, 1982). Although Yugoslav firms tend to be large, divisionalization into BOAL's has produced a counter-tendency towards decentralization within firms.

11. Similar approaches have proved fruitful in studies of labour market dynamics in Italy (Salvatore, 1980) and in Spain (Garcia-Ferrer, 1980).

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12. This model is derived from Todaro (1969, 1976). It has been applied to other peripheral European economies : to Spain by Garcia-Ferrer (1980) and to Italy by Salvatore (1980). It has also been applied to Yugoslavia by Sapir (1981) but his results differ significantly from those presented here and failed to explain unemployment, as the mean percentage error of the predicted value of unemployment under dynamic simulation was over 100%.

13. A recent study by Wyzan (1982) finds no evidence of any relationship between social sector incomes and labour market conditions in the post 1965 period. This conclusion is substantiated by the results of an econometric investigation of the Phillips-curve relationship for Yugoslavia.

14. In the latter part of our period, Social Compacts were in force which stipulated employment targets to enterprises. For the period 1953-71 a regression of the following form: (Share of industry output in GDP) = $\alpha_0 + \alpha_1$ (ln time) gives an $\bar{R}^2$ of 0.92. If industrial output shows a strong time trend, then it is likely that industrial employment will too, as the two are closely correlated (Dubey, 1975).

15. Sapir (1981) concludes that "it would appear that fluctuations in the level of external migration were basically determined by the situation prevailing on the German labour market" (p. 164).

16. An extended model might attempt to endogenize some of these variables. See e.g. Salvatore (1980).

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17. Sapir (1981) reports results for a similar equation over the period 1954-1972. His equation is:

$$m = \underset{(3.33)}{3.218n} \overset{+}{-} \underset{(2.57)}{0.011p} \overset{+}{-} \underset{(4.14)}{0.02i} \overset{+}{-} \underset{(2.32)}{0.012\ DUM3}$$

$$R^2 = 0.65;\ D\text{-}W = 1.49$$

with associated elasticities of the rate of migration with respect to job probabilities of 0.1 (much lower than ours) and for wages of 1.0 (ours would be 1.2). However there are differences in the definition of variables: m includes external migrants originating from the agricultural sector, and i is the average wage of unskilled workers alone. DUM3 is a dummy variable representing the 1965 reforms, on the argument that this represents "a downward shift in the expectation of finding a job". But this, of course, would be picked up by the p variable itself. (The ambiguity over the sign pattern is due to misprints in the original article but should presumably read +, +, -.)

18. OLS yields consistent and unbiased estimators in a recursive system with lagged endogenous variables so long as the error terms do not exhibit serial correlation (see Dhrymes, 1970, p. 170). Fortunately, in the present case examination of the h-statistic shows that serial correlation is absent.

19. The expost forecast for 1977 to 1981 is also shown, and can be seen to follow the actual path rather closely.

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Table 1. Unemployment Rate and Structural Change Equations

Variable

u_t	Cnt	θ_t	θ_{t-1}	σ_t	r_t	x_t	u_{t-1}	R^2	h
1	0.04	-0.018		0.014	0.005	-0.71	0.64	.95	0.015
	(2.4)	(3.3)		(.29)	(1.9)	(4.0)	(5.2)		
2	0.037	-0.017		-0.009	0.005	-0.69	0.66	.95	0.11
	(2.4)	(3.3)		(.19)	(1.7)	(3.9)	(5.4)		
3	0.048	-0.018				-0.47	0.67	.93	1.046
	(3.3)	(3.3)				(3.3)	(5.3)		
4	0.035		-0.016	0.023	0.005	-0.68	0.67	.94	0.105
	(2.1)		(2.9)	(.45)	(1.7)	(3.7)	(5.2)		

θ_t	Cnt	u_t	σ_t	r_t	x_t	θ_{t-1}	R^2	h
5	0.063	0.077	-2.12	-0.011	-0.53	0.97	.99	-0.06
	(.93)	(.15)	(12.5)	(1.2)	(.81)	(44.4)		
6	0.072		-2.12	-0.011	-0.58	0.96	.99	-0.02
	(2.5)		(13.0)	(1.2)	(1.03)	(89.2)		
7	0.088		-2.12	-0.017		0.96	.99	-0.15
	(3.7)		(12.9)	(2.5)		(91.4)		

(Bracketed figures denote t-statistics.)

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TABLE 2

DATA

Year	P(th)	X(th)	D(th)	E(th)	U(th)	A(th)	θ	u	p	m%	g (%)	x(%)
1957	8156	81	8075	2392	124	5559	2.21					
1958	8208	86	8122	2552	174	5396	1.98	.064	.92	3.4	6.7	0
1959	8260	91	8169	2730	165	5274	1.82	.057	1.08	2.7	7.0	0
1960	8312	94	8218	2972	185	5061	1.60	.059	1.31	4.4	8.8	0
1961	8364	106	8258	3242	233	4783	1.37	.067	1.16	5.8	9.1	0
1962	8417	126	8291	3318	274	4699	1.31	.076	.28	1.9	2.3	0.2
1963	8470	166	8304	3390	229	4685	1.29	.063	.31	0.2	2.2	0.5
1964	8523	191	8332	3608	228	4496	1.17	.059	.96	4.1	6.4	0.3
1965	8571	216	8355	3662	267	4426	1.13	.068	.20	1.4	1.5	0.3
1966	8625	286	8339	3582	265	4492	1.17	.069	- .30	-2.1	-2.2	0.8
1967	8670	296	8374	3561	292	4521	1.17	.076	- .07	-0.6	-0.6	0.1
1968	8725	401	8324	3587	327	4410	1.13	.084	.08	1.4	1.4	1.2
1969	8780	572	8208	3706	316	4186	1.04	.076	.38	3.1	3.1	2.0
1970	8834	783	8051	3850	290	3811	.94	.070	.50	3.9	3.9	2.6
1971	8890	923	7967	4032	290	3645	.84	.067	.63	5.0	4.7	1.7
1972	9014	1020	7944	4210	334	3450	.76	.074	.53	5.9	4.4	1.2
1973	9034	1100	7934	4306	399	3229	.69	.085	.24	4.3	2.3	1.0
1974	9087	1035	8052	4514	479	3059	.61	.096	.43	6.6	4.8	-0.8
1975	9147	940	8207	4758	584	2865	.54	.109	.42	8.5	5.4	-1.0
1976	9206	870	8336	4925	665	2746	.49	.114	.25	5.8	3.5	-0.9
1977	9242	825	8417	5148	718	2569	.44	.116	.351	7.4	4.5	-0.5
1978	9286	800	8486	5383	735	2368	.39	.120	.336	7.8	4.6	-0.3
1979	9324	790	8534	5615	762	2157	.34	.119	.316	8.5	4.3	-0.1
1980	9385	770	8615	5798	785	2032	.30	.119	.240	7.0	3.3	-0.2
1981		770		5966	809			.119	.214	6.2	2.9	0.0

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Sources

P : Total Population, including workers overseas.
For 1964-1966, 1967-1979 from OECD 1973, 1980.
For 1957-1963 from

X : Stock of Yugoslav workers employed abroad.
For 1957-1966, Baletić and Baučić.
For 1967-1977, OECD 1980.

E : Social sector employment, from Baletić and Baučić.

U : Registered unemployment, from SGJ, 1958, 1967, 1974, 1979.

D : Net domestic population = $P_t - X_t$.

A : Agricultural labour force = $D_t - E_t - U_t$.

θ : Sectoral composition of the labour force = $A_t/(E_t + U_t)$.

u : Social sector (urban) unemployment rate = $U_t/(E_t + U_t)$.

p : Probability of getting a job = $\Delta E_t/U_{t-1}$.
This is strictly speaking a parameter of the probability distribution of the waiting time to employment so $0 \not< p \not< 1$.

m : Rate of rural - urban migration :

$$m_t = \frac{\Delta L_t - (0.01)(L_{t-1}) + 0.4\ (\Delta X_t)}{A_{t-1}}$$

We subtract $0.01\ L_{t-1}$ from the increase in social sector workforce on the assumption that the natural rate of population growth is around 1% p.a. over the period (Schrenk et al. p. 278). This represents a rough compromise between the 1.25% of the less developed regions and the 0.5% of the more developed. In addition we must add back the 40% of annual external migration which originated from the social sector (Schrenk p. 266).

g : Growth of social sector employment; $g = \frac{\Delta E_t}{E_{t-1}}$.

x : Rate of external migration; $x_t = \frac{\Delta X_t}{D_{t-1}}$.

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TABLE 3

DATA

	SI	AIH	H	AI	R.	EXR
1957	1728	2808	3.29	853	2.03	
1958	1812	2531	3.19	793	2.28	2.10
1959	2124	2979	3.12	955	2.22	2.40
1960	2436	2907	2.99	972	2.51	3.28
1961	2640	3261	2.83	1152	2.29	2.66
1962	2904	3564	2.78	1282	2.27	0.63
1963	3420	4496	2.77	1623	2.10	0.66
1964	4344	6078	2.66	2285	1.90	1.82
1965	6012	5799	2.62	2213	2.72	0.55
1966	8316	7577	2.65	2859	2.91	-0.88
1967	9444	6879	2.68	2567	3.68	-0.26
1968	10344	6591	2.61	2525	4.10	0.33
1969	11880	8042	2.48	3243	3.66	1.38
1970	14076	8960	2.31	3879	3.63	1.80
1971	17184	10303	2.16	4770	3.60	2.26
1972	20112	14807	2.04	7258	2.77	1.48
1973	23256	18386	1.91	9626	2.42	0.58
1974	29724	21310	1.81	11773	2.52	1.10
1975	36720	25632	1.70	15078	2.44	1.02
1976	42420	29952	1.62	18489	2.29	0.58
1977	50376	37087	1.51	24561	2.05	0.64

Sources and Definitions

SI : Social sector personal incomes.

From SGJ 1967 (122-1); 1975 (123-1); 1979 (123-1) and National Bank of Yugoslavia Annual Report 1983 (units new dinars per annum). Monthly figures have been multiplied by 12.

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AI : Agricultural sector per family income, income from holding, from SGJ 1962 (205-57); 1967 (107-55); 1971 (107-55); 1973 (107-55); 1976 (107-52); 1974 (107-52).

Income from holding includes both cash sales and own product.

H : Average number of active workers per household. In 1964 there were 1.69 m. holdings of size 2 ha. or over (S.H. Franklin). (On smaller holdings, the greater part of the income is earned off the farm as these mini-holdings are uneconomic). We divide the total active agricultural population by this figure to arrive at farm workforce per farm, $H = \frac{A}{1,690,000}$.

AI : Agricultural sector personal incomes,

$AI = \frac{AIH}{H}$.

R : Relative urban-rural incomes, $R = \frac{SI}{AI}$.

EXR : Expected urban-rural income differentials, EXR = p.R.

DATA SOURCES

Data were derived from the following tables in Statiskički Godišnjak Jugoslavije:

Employment : 1966, 104-2; 1967, 105-2; 1979, 105-2.
Unemployment : 1967, 104-11; 1976, 105-13; 1979, 105-13.
Urban incomes : 1967, 122-1; 1975, 123-1; 1979, 123-1.
Rural incomes : 1962, 205-57; 1967, 107-55; 1971, 107-55; 1973, 107-55; 1976, 107-52; 1979, 107-52.

Data on active population were derived from OECD "Yugoslavia", 1973 (table G), 1980 (table H).

Data on external migration and social sector employment were derived from Baletić, Z. and Baučić, I., "Population, Labour Force and Employment in Yugoslavia", Wiener Institut fur Internationale Wirtschaftsvergleiche, 1979.

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Data on farm workforce were derived from S.H. Franklin, "The European Peasantry", Methuen, 1969.

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